# A new raphitomine neogastropod from the Mediterranean Sea (Conoidea)

## Una nueva especie de *Raphitoma* (Conoidea) del mar Mediterráneo

Francesco PUSATERI* and Riccardo GIANNUZZI-SAVELLI**

*Recibido el 14-X-2007. Aceptado el 30-V-2008*

ABSTRACT

*Raphitoma villaria* n. sp. is described from Taormina (Sicily) and is compared with the closely related *R. leufroyi* (Michaud, 1828). Differential characters are given for the protoconch, the adult shell, and the colour pattern of the living animal. *Raphitoma villaria* n. sp. lacks a radula which is present in *R. leufroyi*. The new species has been confused with *R. erronea* (Monterosato, 1884), which is a different species.

RESUMEN

Se describe *Raphitoma villaria* n. sp. de Taormina (Sicilia) y se compara con la especie estrechamente emparentada *R. leufroyi* (Michaud, 1828). Se indican caracteres diferenciales relativos a la protoconcha y al patrón de color del animal vivo. *Raphitoma villaria* n. sp. carece de radula, la cual está presente en *R. leufroyi*. La especie nueva se ha confundido con *R. erronea* (Monterosato, 1884), que es una especie distinta.

KEY WORDS: Gastropoda, Mediterrenean Sea, new species, *Raphitoma*.
PALABRAS CLAVE: Gastropoda, mar Mediterráneo, nueva especie, *Raphitoma*.

## INTRODUCTION

The Mediterranean species of the subfamily Raphitominae are currently being revised by Pusateri, Giannuzzi-Savelli, Spada and Oliverio. Prior to the main revision, we present here the description of a new species that can be confused (and actually has been) with *Pleurotoma volutella* Kiener, 1846.

Kiener (1846: 67) described *P. volutella* as recent from Sicily, yet it is known that sometimes he reported fossil species as living [S. Palazzi, pers. comm.]. In fact, *Pleurotoma volutella* is relatively well known from the Plio-Pleistocene (Seguenza, 1880; de Lamothe and Dautzenberg 1908; Cerulli-Irelli, 1910; Harmer, 1915; Alberici and Tamini, 1935; Compagnoni, Conato, Follieri and Malatesta, 1969). No recent specimens have been found by the authors during the present revision, despite the examination of over 200 lots of raphitomines of the *R. leufroyi* (Michaud, 1828) group. All recent records in the literature are either secondary references derived from Kiener's original error (Carus, 1893; Piani, 1980; Sabelli, Giannuzzi-Savelli, and Bedulli, 1990) or erroneous identifications of particular morphotypes of

* Via Castellana, 64 - 90135 Palermo, Italy.
** Via Mater Dolorosa, 54 – 90146 Palermo, Italy. e-mail: malakos@tin.it

*Raphitoma leufroyi* (e.g.: PHILIPPI, 1844; ARADAS AND BENOIT, 1876; MONTEROSATO, 1878; PRIOLO 1967). Unfortunately, the types of *P. volutella* have not been found, despite search in the Delessert collection (Y. Finet, Geneve, pers. com.), in the MNHN collections, and in other European museums.

In the Monterosato collection (ZMR) there are two specimens labelled "*Defrancia volutella*, Palermo" and "*Leufroya volutella*, fossile di Ficarazzi", respectively (Figs. 19, 20).

In the Melvill-Tomlin collection (NMW, 12930) there is a specimen (Fig. 21) labelled by Monterosato "*Leufroya volutella* Kiener, fossile di Ficarazzi, non vivente". A second handwritten label reads: "Kiener a cru vivant un specimen ramassé par la mer". All these specimens fit perfectly the original figure by Kiener, and are congruent with the usual interpretation of *Pleurotoma volutella*, as a fossil.

A recent species, included in the genus *Raphitoma*, has possibly been confused in collections under the name *Leufroya volutella*. It is a different unnamed species that is herein described as new.

## RESULTS

### *Raphitoma villaria* n. sp.

*Pleurotoma (Defrancia) volutella* sensu Tiberi in schedis non Kiener, 1846 (Swedish Mus. Nat. Hist. n. 70490)
*Leufroya volutella* sensu AA. non Kiener, 1846
*Raphitoma (Leufroya) erronea* sensu Mifsud, 2003 non Monterosato, 1884
? *Raphitoma leufroyi* sensu Rolán et al., 1998 non Michaud, 1832

**Type material**: Holotype (MNHN, Paris: Figs. 1-3), height 17.3 mm, width 6.8 mm, from Taormina, -15 m, bioclastic sediment (A. Villari leg.). Paratype A (Figs 4, 6, 8; MNHN, Paris, C. Mifsud, leg., ex Gubbioli collection; height 11.5 mm, width 4.6 mm), from Malta, off Ras il-Wahx, –80/100 m, muddy sand with *Posidonia* debris. Paratype B (C. Mifsud coll., Malta; height 14.4 mm, width 5.6 mm), from Malta, off Ras il-Wahx. Paratype C (Fig. 10; Gori coll., Livorno; height 16.9 mm, width 6.5 mm), from Capraia Is., -150 m. Paratype D (Figs 11, 12; F. Pusateri coll., Palermo; height 12 mm, width 4.8 mm, juvenile), from Bay of Carini (Palermo), coralligenous bottoms. Paratype E (Bini coll., Città di Castello; height 8.6 mm, width 3.9 mm, juvenile), from Antiparos Is. (Cyclades), -180/250 m. Paratype F (SMNH, Stockholm, n. 70490; ex N. Tiberi, labelled *Pleurotoma (Defrancia) volutella*; height 9.3 mm, width 4.7 mm, juvenile), from Sardinia, coralligenous bottom.
**Other material examined**: 18 shells from Gnejna Bay (Malta), 80/100 m; 5 shells from Qammich reef (Malta), -80 m; 1 shell from Misurata (Lybia), -60/80 m. (all in the C. Mifsud collection).
**Type locality**: Taormina, eastern Sicily, -15 m, bioclastic sediment.
***Derivatio nominis***: After our dear friend Alberto Villari (Villari+A(lberto) = *villaria*) used as a noun in apposition.

*Description*: Shell slender, fusiform, 15-18 mm high and 6-7 mm wide.

Protoconch multispiral, of 3.25 whorls. Protoconch I of 1.2, dome shaped whorls, with a sculpture of 8-9 spiral threads, covered by minute tubercles; tubercles tending to become oblong and anastomosing, giving rise to a somewhat clathrate pattern. Protoconch II of slightly more than 2 convex whorls, with a sculpture of only subsutural axial threads on the adapical third, tending to curve adaperturally. On the lower two thirds sculpture of diagonally crossing threads. Sinusigera outer lip at the protoconch-teleoconch boundary.

Teleoconch of 6-7 whorls, with stepped spire. Subsutural ramp narrow, suborizontal, tending to obliterate after the sixth whorl. Adsutural marks of the anal sinus visible on the ramp. Axial sculpture of 15-18 ribs, narrower than the interspaces, reaching the base.


Figures 1-3. *Raphitoma villaria* n. sp. Holotype (MNHN, Paris, h. 17.3 mm, w. 6.8 mm), Taormina -15 m.

*Figuras 1-3.* Raphitoma villaria *n. sp. Holotipo (MNHN, Paris, h. 17,3 mm, d. 6,8 mm), Taormina - 15 m.*

Spiral sculpture of numerous continuous cordlets, 13-16 above the aperture, regularly spaced, on the body whorl; 10-12 strong cords on the siphonal canal.

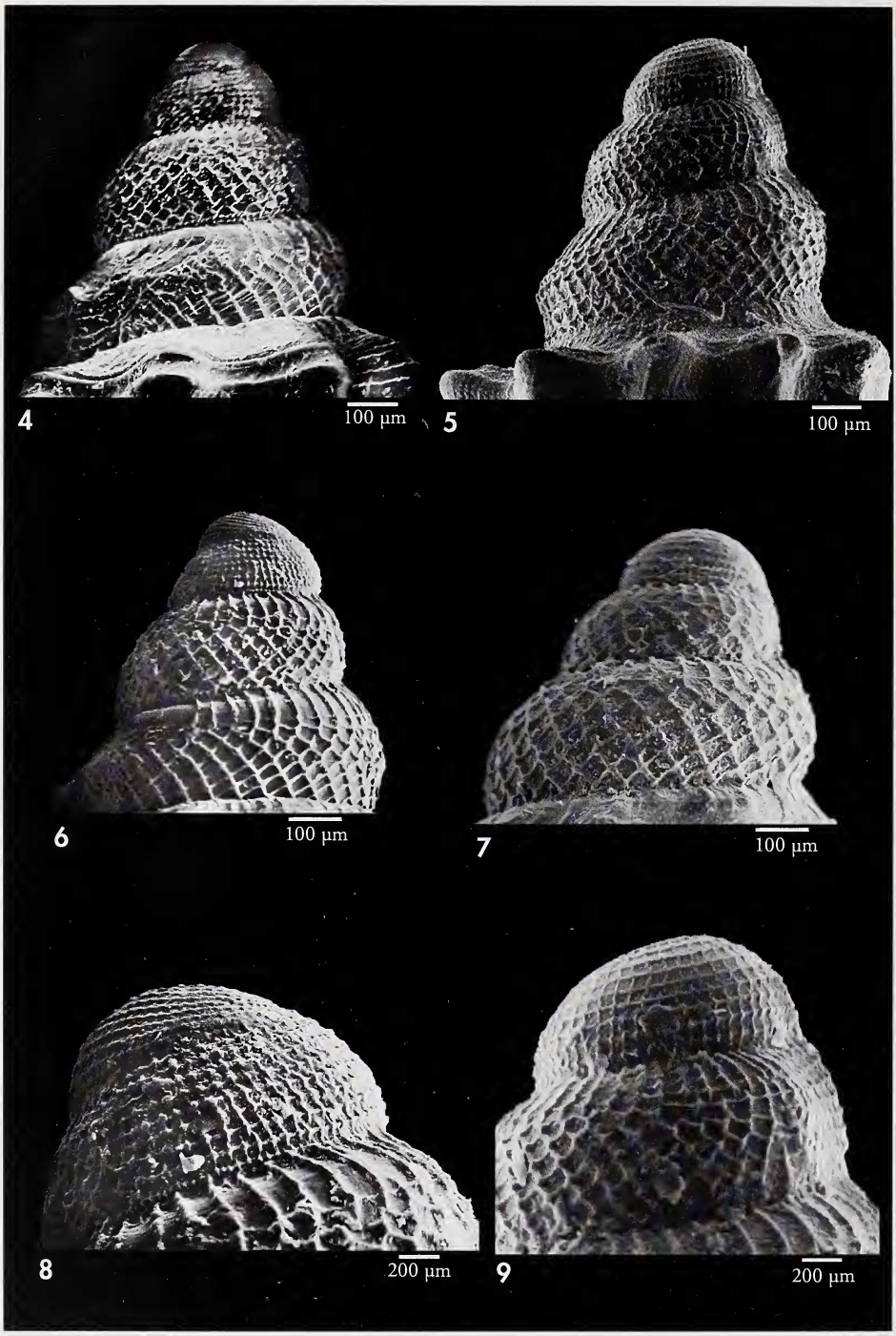
Aperture suboval, tapering anteriorly. Outer lip simple, internally smooth. Anal sinus as deep as the interspace between two axial ribs. Inner lip smooth, arcuate posteriorly, straigth medially. Siphonal canal short, open.

Background colour yellowish with a lighter narrow band on the lower third of the spire. The spiral cordlets within this band may be sligthly stronger that the others.

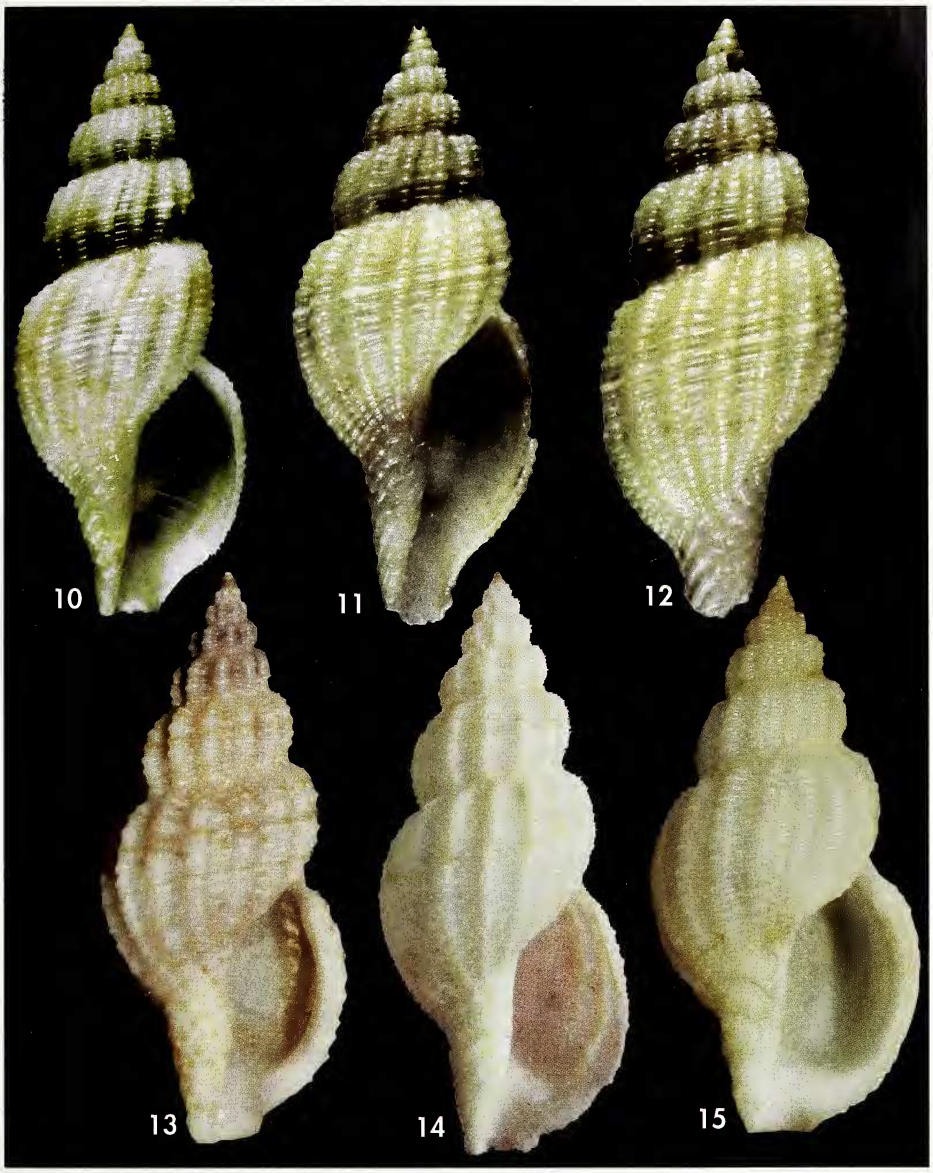
Animal with a short head and two short tentacles. Eyes placed on the external, thickened basal part of the tentacles, at about one third of their total height. Foot narrow and long with two anterior lateral triangular lobes and a pointed posterior end. Colour light yellow with a lighter coloured foot, darker tentacles and black eyes. Siphon much darker (nearly orange) in colour. Operculum absent.

*Distribution*: Known from the type locality (Taormina, eastern Sicily) and from Malta, Bay of Carini (northwestern Sicily), Capraia Is. (Northern Tyrrhenian Sea). ROLÁN, OTERO-SCHMITT AND FERNANDES (1998: 108, figs 26-28) reported a shell from Angola extremely similar to the new species. Considering the lack of additional data on the extra-Mediterranean occurrence of *R. villaria* n. sp. we cannot confirm the identity of the Angolan material. It could represent a sibling species, or the extreme southern range of the new species.

*Remarks:* The foregut anatomy of a specimen of this species (under the name *"Caenodagreutes erronea"*) was examined and described by Don




Figures 4-9. Protoconchs of *Raphitoma*. 4, 6, 8: *R. villaria* n. sp. (paratype A); 5, 7, 9: *R. leufroyi*, specimen from Palermo (coll. Pusateri).
*Figurs 4-9. Protoconchas de* Raphitoma. *4, 6, 8:* R. villaria *n. sp. (paratipo A); 5, 7, 9:* R. leufroyi, *ejemplar de Palermo (coll. Pusateri).*




Figures 10-15. Shells of *Raphitoma*. 10: *R. villaria* n. sp. (paratype C), Capraia Is., -150 m (coll. Gori, Livorno, h. 16.9 mm, w. 6.5 mm); 11, 12: *R. villaria* n. sp. (paratype D), Bay of Carini, Palermo, (subadult, coll. Pusateri, Palermo, h. 12 mm, w. 4.8 mm); 13: *R. concinna*, Termini Imerese (Palermo), muddy sand (coll. Pusateri, Palermo, h. 13.8 mm); 14: *R. leufroyi* ("var. *albescens*"), Palermo, coll. Monterosato (MZR, Rome); 15: *Defrancia erronea* Monterosato, 1884. mm 22 x 16, holotype, handwritten label by Monterosato: "*D. volutella Sardegna tipo di erronea*" (MZR lot n. 16704).
*Figuras 10-15. Conchas de* Raphitoma. *10:* R. villaria *n. sp. (paratipo C), Isla de Capraia, -150 m (coll. Gori, Livorno, h. 16,9 mm, d. 6,5 mm); 11, 12:* R. villaria *n. sp. (paratipo D), Bahía de Carini, Palermo, (subadulto, coll. Pusateri, Palermo, h. 12 mm, d. 4,8 mm); 13:* R. concinna, *Termini Imerese (Palermo), arena fangosa (coll. Pusateri, Palermo, h. 13,8 mm); 14:* R. leufroyi *("var. albescens"), Palermo, coll. Monterosato (MZR, Roma); 15:* Defrancia erronea *Monterosato, 1884. mm 22 x 16, holotipo, etiqueta manuscrita de Monterosato:* "D. volutella Sardegna tipo di erronea" *(MZR lot n. 16704).*

Tippett (*in litteris*, 2001). The specimen (15.5 mm long and 6.1 mm wide, protoconch tip missing, 1.5 protoconch whorls remaining, diagonally cancellate) originated from Malta, Qummick, 80 m depth (vi. 1988, C. Mifsud leg.). The specimen lacked a proboscis, poison apparatus, radula and salivary glands. The rhynchodaeum was very retracted and folded, with the posterior end bearing a tiny circular opening into the oesophagus.

Pending a phylogenetic assessment of the Raphitominae, we ascribe the new species to the genus *Raphitoma* Bellardi 1848 (type species, by subsequent designation [Monterosato, 1875]: *Pleurotoma hystrix* Cristofori and Jan, 1832).

A group of species with the aperture internally smooth, without either teeth or lyrae is commonly included in the subgenus *Leufroya* Monterosato, 1884 (type species by tautonymy *Pleurotoma leufroyi* Michaud, 1828): *Raphitoma leufroyi* (Michaud, 1828), *R. concinna* (Scacchi, 1836), *R. erronea* (Monterosato, 1884), *R. linearis* (Montagu, 1803), *R. aequalis* (Jeffreys, 1867). The new species belongs clearly in this group, being very similar to *R. leufroyi*. Comparing two mature specimens of each species, the protoconch is smaller in *leufroyi* (450 μm vs 600 μm) and generally brown in colour (vs. yellowish in *villaria*). The subsutural ramp is absent in *leufroyi*; the h/d ratio is higher in *villaria* (h/d > 2.5 vs < 2.2 in *leufroyi*). The spiral cordlets (16 in *villaria* vs 12 in *leufroyi*) are all of the same size in *villaria* vs. of alternate size in *leufroyi*. The outer lip is thickened in *leufroyi* vs. simple in *villaria*.

The background colour is lighter with brownish spots in *leufroyi* and uniformly yellowish in *villaria*. The animal of *leufroyi* is pure white, with light blue blurs on the end of the foot. The eyes are larger in *leufroyi* and are placed halfway up the tentacles. The foot is wider in *leufroyi*. The radula is present in *leufroyi* and absent in *villaria*. Even in some occasional ligthly coloured specimens of *leufroyi* the remaining differences hold diagnostic.

This species has been confused in several collections with *R. erronea* (Monterosato, 1884), which is completely different, having more numerous spiral cordlets, a shorter siphonal canal, a more rounded aperture, and a h/d ratio of 1.25 (vs. 2.5 in *villaria*).

*R. volutella* (see figs 18-21) has a more stepped outline, and a longer siphonal canal, axial and spiral sculpture are stronger.

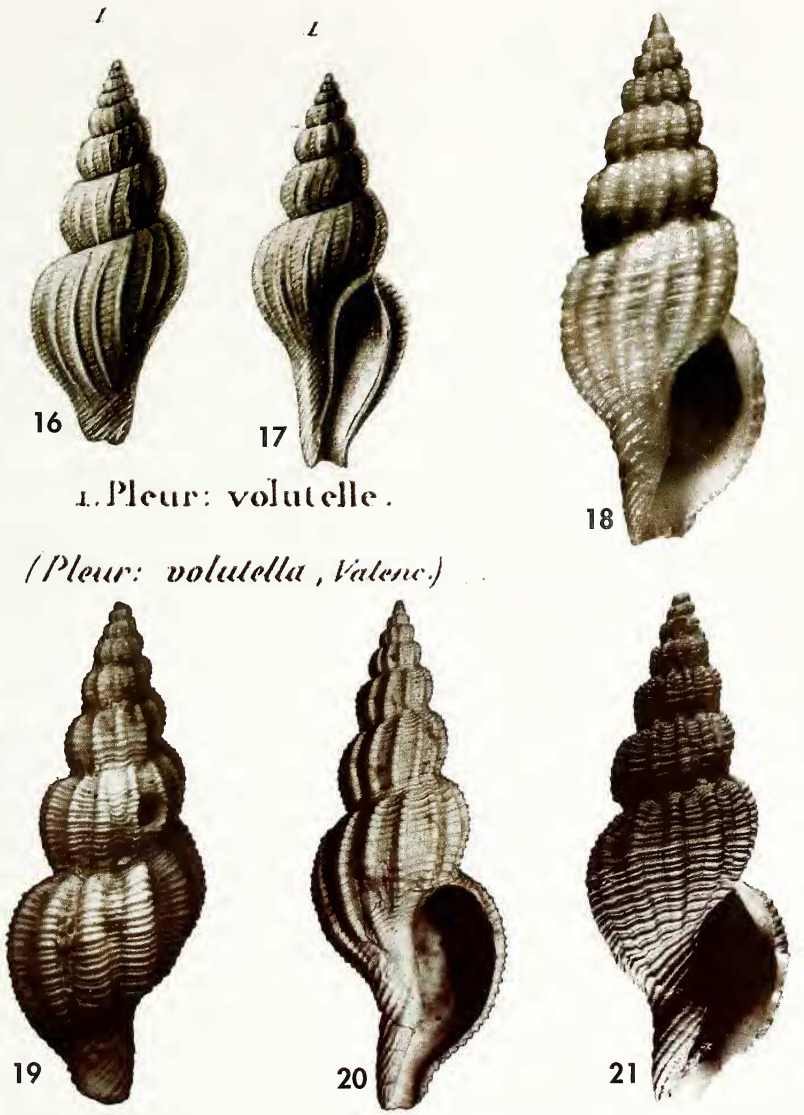
*R. concinna* is smaller (<15 mm), and the axial ribs are always ≤ 14 (vs. 15 in *villaria*). The axial interspaces and ribs are of equal size (interspaces wider in *villaria*). *R. villaria* has more numerous and weaker spiral cordlets , and lacks the typical brown cordlets of *concinna*. Finally, the protoconch of *R. concinna* is violet while it is always yellowish in *villaria*.

## ACKNOWLEDGEMENTS

We wish to thank our friends Gianluigi Bini, Sandro Gori, Constantin Mifsud, Alberto Villari who allowed us to study their collections, and particularly Franco Gubbioli who generously donated one paratype. Gianni Sartore and Nando Ghisotti helped with bibliographic support. Don Tippett kindly provided his notes on the anatomy of the new species. Alberto Palmeri constantly helps us in our studies. Marco Oliverio, Gianni Spada and Bruno Sabelli provided useful hints on previous versions of this ms.

Philippe Bouchet, Virginie Heros and Pierre Lozouet (MNHN, Paris) kindly assisted during our visits to the "Labo". Claudio Manicastri (ZMR, Rome) allowed examination of the material in the Monterosato Collection. Anders Warén (SMNH, Stockholm) and Harriet Wood (National Museum of Wales) provided useful material for study, and Yves Finet (MHNG, Geneve) for information on Kiener types.

C. Mifsud provided the data on the living animals of *R. villaria* n. sp. and *R.*




Figures 16-21. Shells of *Raphitoma villaria* n.sp. and *Pleurotoma volutella*. 16, 17: Original figure of *Pleurotoma volutella* (after Kiener, 1846, photo courtesy Virginie Heros, MNHN Paris); 18: *Raphitoma villaria* n. sp., paratype A, off Ras il-Wahx, Malta, (ex Gubbioli collection), h 11.5 mm, d 4.6 mm; 19, 20: *P. volutella*, Palermo (Coll. Monterosato, MZR, Rome, lote n. 16704, "*Defrancia volutella*"); 21: *P. volutella*, Ficarazzi, coll. Melvill-Tomlin (NMW, 12930) with Monterosato's handwritten label ["*Leufroyia volutella* Kiener", fossile di Ficarazzi, non vivente]. A second handwritten label (also by Monts.) reads: "Kiener a cru vivant un specimen ramassé par la mer".
Figuras 16-21. Conchas de *Raphitoma villaria* n.sp. y *Raphitoma volutella*. 16, 17: Figura original de *Pleurotoma volutella* (reproducido de Kiener, 1846, fotografía de Virginie Heros, MNHN Paris); 18: *Raphitoma villaria* n. sp., paratipo A, frente a Ras il-Wahx, Malta, (colección Gubbioli), h 11,5 mm, d 4,6 mm; 19, 20: *P. volutella*, Palermo (Coll. Monterosato, MZR, Roma, lote nº 16704, "*Defrancia volutella*"); 21: *P. volutella*, Ficarazzi, coll. Melvill-Tomlin (NMW, 12930) con etiqueta manuscrita de Monterosato ["*Leufroyia volutella* Kiener", fossile di Ficarazzi, non vivente]. Una segunda etiqueta manuscrita (también de Monts.) reza: "Kiener a cru vivant un specimen ramassé par la mer".

*leufroyi*, while Javier López sent a picture of the animal of *L. leufroyi*. SEM photographs were taken by Anna Maria Mannino and Francesco Furnari (Dipartimento di Scienze Botaniche, University of Palermo). Digitalization of images was by Floriana Giannuzzi-Savelli.

## BIBLIOGRAPHY

ALBERICI, E. AND TAMIN, E., 1935. Contributo allo studio dei molluschi del Quaternario marino di Rodi (Egeo). *Rendiconti Reale Istituto Lombardo di Scienze e Lettere*, serie 2, 68: 213-228, pl. 3.

ARADAS, A. AND BENOIT, L., 1872-1876. Conchigliologia vivente marina della Sicilia e delle isole che la circondano. *Atti dell'Accademia Gioenia di Scienze Naturali*, (3) 6: 1-113 + pl. 1-2 [1872]; 113-226 + pl. 3-4 [1874]; 227-324 + pl. 5 [1876]

CARUS, J. V., 1893. *Prodromus faunae Mediterraneae sive descriptio animalium Maris Mediterranei incolarum quam comparata silva rerum quatenus innotuit adiectis locis et nominibus vulgaribus*. Stuttgart, E. Schweizerbart'sche. Vol. II. *Brachiostomata. Mollusca. Tunicata. Vertebrata*. ix + 854 pp.

CERULLI-IRELLI, S., 1910. Fauna Malacologica Mariana Parte Quarta. Scaphopoda:-Dentalidae. Gastropoda:-Stenogyridae, Gadiuiidae, Acteonidae, Tortnatinidae, Scaphandridae, Bullidae, Ringiculidae, Philinidae, Umbrellidae, Conidae, Pleurotomidae. *Palaeontographia Italica* 16:23-70, pls. 3(34)-6(37).

COMPAGNONI, B., CONATO, V., FOLLIERI, M., MALATESTA, A., 1969. Il Quaternario di Scalea. *Quaternaria* 10, 95-123, Roma

DE LAMOTHE AND DAUTZENBERG, P., 1908. Catalogue des Mollusques qu'ils renferment. Pp. 488-501 *in de* Lamothe. Les Gîtes fossilifères des marnes plaisanciennes du Sahel d'Alger. *Bulletin de la Société Géologique de France*, série 4, 7:481-505. [In this paper *de* Lamothe is listed as "Le Général de Lamothe".]

HARMER, F. W., 1915. The Pliocene Mollusca of Great Britain being supplementary to S. V. Wood's Monograph of the Crag Mollusca. Part II. *Monograph of the Palaeontological Society of London* 68:201-302, pls. 25-32. [Pyrah, 1978, listed Harmer's specimens preserved in the Yorkshire Museum.]

KIENER, L. C., 1846. Genre Pleurotome. (*Pleurotoma*, Lam.) *Spécies général et iconographie des coquilles vivantes comprenant la collection du Muséum d'Histoire naturelle de Paris, collection Lamarck, celle du Prince Masséna et les découverts récente des voyageurs*. Paris, Rousseau. 84 pp., 27 pls.

MICHAUD, A. L. G., 1829. Description de plusieurs espèces nouvelles de coquilles vivantes. *Bulletin d'Histoire Naturelle de la Société Linnéenne de Bordeaux* 3: 260-275, 24 figs.

MIFSUD, C., 2003. Note su alcuni molluschi viventi da Malta. *La Conchiglia* 307: 39-46.

MONTEROSATO, M. DI, 1878. Enumerazione e sinonimia delle conchiglie mediterranee. *Giornale Scienze Naturali ed Economiche, Palermo* 13:61-115.

MONTEROSATO, M. DI, 1884. *Nomenclatura generica e specifica di alcune conchiglie mediterranee*. Palermo: Virzi. 152 pp.

PHILIPPI, R. A., 1844. *Enumeratio Molluscorum Siciliae cum viventium tum in tellure tertiaria fossilium quae in itinere suo observavit auctor. Volumen secundum continens addenda et emendanda, nec non comparationem faunae recentis siciliae cum faunis aliarum terrarum et cum fauna periodi tertiariae*. Halis Saxonum, E. Anton. iv + 303 pp., pls. 13-28.

PIANI, P., 1980. Catalogo dei molluschi conchiferi viventi nel Mediterraneo. *Bollettino della Malacologico* 16 (5/6):113-224.

PRIOLO, O., 1967. Nuova revisione delle Conchiglie marine di Sicilia. Memoria XVIII. *Atti dell'Accademia Gioenia di Scienze Naturali di Catania*, (6)19: 667-714, pls. 1-3.

ROLÁN, E., OTERO-SCHMITT, J. AND FERNANDES, F., 1998. The family Turridae s.l. (Mollusca, Gastropoda) in Angola (West Africa), 1. Subfamily Daphnellinae. *Iberus*, 16 (1): 95-118.

SABELLI, B., GIANNUZZI-SAVELLI, R. AND BEDULLI, D., 1990. *Catalogo annotato dei Molluschi marini del Mediterraneo*. Bologna, Edizioni Libreria Naturalistica Bolognese. Vol. 1: xiv + 348 pp. [Title also given in English *"Annotated check-list of Mediterranean marine mollusks"*.]

SCACCHI, A., 1836. *Catalogus conchyliorum regni Neapolitani quae usque adhuc reperit*. Napoli, Filiatre Sebetii. 18 pp., 1 pl.

SEGUENZA, G., 1880. Le formazioni terziarie nella provincia di Reggio (Calabria). *Memorie della Classe di Scienze Fisiche Matematiche e Naturali della Regia Accademia del Lincei*, serie 3, 6: 1-445, 17 pls.